Explore What a Fraction Is

Learning Target

- Understand a fraction $\frac{1}{b}$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction $\frac{a}{b}$ as the quantity formed by a parts of size $\frac{1}{b}$.

SMP 1, 2, 3, 4, 5, 6

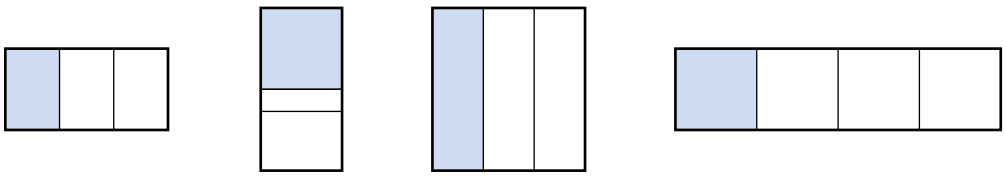
How can you describe equal parts?

MODEL IT

Complete the problems below.

1 **Fractions** are numbers that tell about equal parts of a whole.

a. Circle all the shapes that show one third shaded.



b. How do you know you circled the right shapes in Part a?

2 There are two numbers to a fraction. The bottom number, the **denominator**, tells how many equal parts are in the whole. The top number, the **numerator**, tells how many equal parts are being described. Write the fraction for the shaded part of the shapes you circled in problem 1.

$$\frac{\text{parts shaded} \rightarrow \square}{\text{parts in the whole} \rightarrow \square}$$

3 You write or name the fraction $\frac{1}{3}$ in words as "one third."

a. How would you write the fraction $\frac{1}{4}$ in words?

b. How would you write the fraction $\frac{1}{2}$ in words?

DISCUSS IT

- Did you and your partner use the same words to name the fractions in problem 3?
- I think you can use words or a number to name a fraction because . . .

MODEL IT

Complete the problems below.

4 A **unit fraction** has a 1 in the numerator. It names 1 part of a whole.

Shade $\frac{1}{4}$ of the model below.

5 Look at the same model again.

a. Shade three fourths of the model.

b. How could you count each fourth you shaded to also name the fraction? Fill in the missing fourths.

1 fourth, _____ fourths, _____ fourths

c. Write the fraction for the parts you shaded in Part a.

$$\frac{\text{parts shaded} \rightarrow \square}{\text{parts in the whole} \rightarrow \square}$$

d. How would you name the fraction from Part c in words?

DISCUSS IT

- Count by $\frac{1}{4}$s up to one whole. How do you know when to stop?
- I think counting by $\frac{1}{4}$s is like counting whole numbers because . . .
- I think counting by $\frac{1}{4}$s is different from counting whole numbers because . . .

6 REFLECT

Explain why the denominator does not change when you are counting by the unit fraction $\frac{1}{4}$ to reach $\frac{3}{4}$.

Prepare for Exploring What a Fraction Is

1 Think about what you know about fractions. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.

Word	In My Own Words	Example
fraction		
numerator		
denominator		

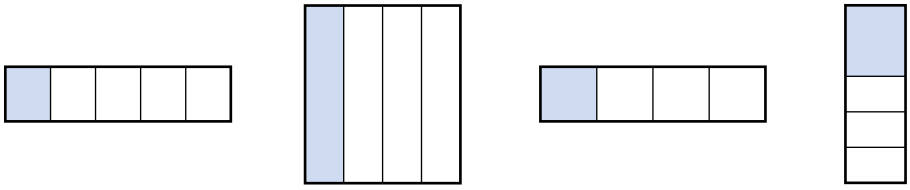
2 Shade two thirds of the model. Write the fraction for the parts you shaded.

parts shaded → ☐

parts in the whole → ☐

Solve.

3 Circle all the shapes that show one fourth shaded. How do you know you circled the right shapes?



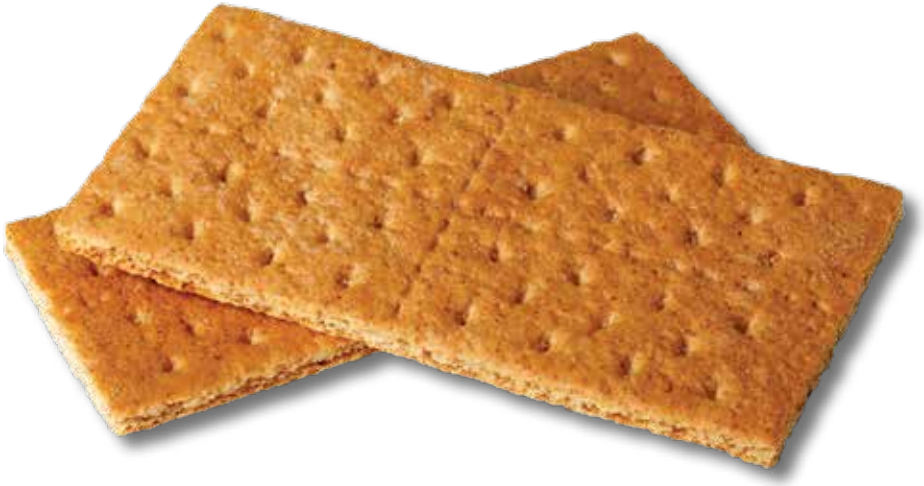
Solution

4 Write the fraction for the shaded part of the shapes you circled in problem 3.

$$\frac{\text{parts shaded} \rightarrow \square}{\text{parts in the whole} \rightarrow \square}$$

5 How would you write the fraction $\frac{2}{4}$ in words?

Solution

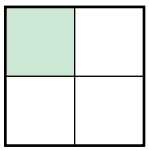


Develop Describing Parts of a Whole with Fractions

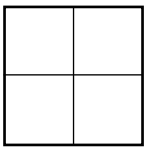
MODEL IT: WRITE FRACTIONS FROM MODELS

Try these problems.

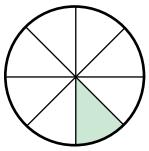
1 **a.** What unit fraction is shown?



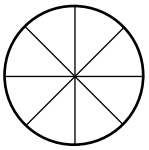
b. Shade 2 parts of the model. What fraction of the square did you shade?



2 **a.** What unit fraction is shown?

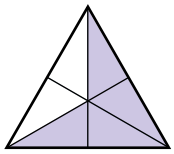


b. Shade 6 parts of the model. What fraction of the circle did you shade?

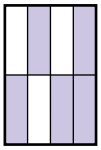


3 Write the fraction of the figure that is shaded. The parts in each model are all equal.

a.



b.



DISCUSS IT

- How did you know what fractions to write in problem 3?
- I think shading equal parts of a figure shows a fraction because . . .

MODEL IT: DRAW MODELS OF FRACTIONS

Draw the figure described.

4 The model below shows $\frac{1}{3}$ of a square. Draw to show the whole square. Then shade to show $\frac{2}{3}$.

5 The model below shows $\frac{1}{4}$ of a rectangle. Draw to show what the whole rectangle could look like. Then shade to show $\frac{2}{4}$.

DISCUSS IT

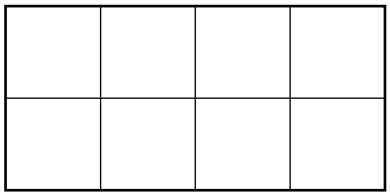
- Did you and your partner draw the same figures for problems 4 and 5? Is there more than one correct answer for each problem?
- I think you need to know what the unit fraction piece of a model looks like to draw the rest of the model because . . .

CONNECT IT

Complete the problems below.

6 How can you use a shaded model to name a fraction?

7 Look at the rectangle.



a. What unit fraction is each part?

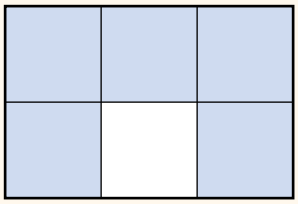
b. Shade 4 parts of the rectangle and write the fraction you shaded.

Practice Describing Parts of a Whole with Fractions

Study how the Example shows how to write a fraction for parts of a whole. Then solve problems 1–8.

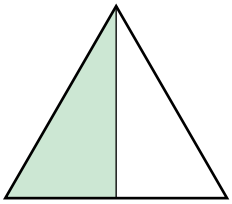
EXAMPLE

- There are 6 equal parts.
- Each part is one sixth, or $\frac{1}{6}$.
- 5 parts are shaded.
- Five sixths of the whole is shaded.
- This model shows the fraction $\frac{5}{6}$.



Fill in the blanks to describe each shape in problems 1 and 2.

1

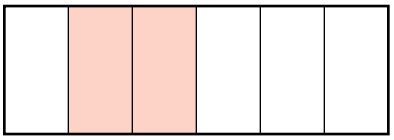


equal parts: .....

shaded part(s): .....

fraction of the whole that is shaded: .....

2



equal parts: .....

shaded part(s): .....

fraction of the whole that is shaded: .....

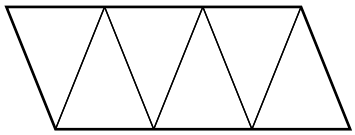
Vocabulary

fraction a number that names equal parts of a whole.

Solve.

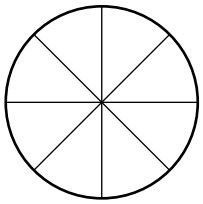
3 Shade this shape to show $\frac{3}{4}$.

4 Shade this shape to show $\frac{2}{6}$.



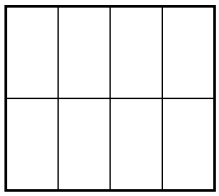
5 Shade 3 parts of this shape.

What fraction is shaded? .....



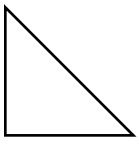
6 Shade 7 parts of this shape.

What fraction is shaded? .....



7 ☐ is $\frac{1}{4}$ of a rectangle.

Draw the rectangle. Show the parts.

8  is $\frac{1}{4}$ of a rectangle.

Draw the rectangle. Show the parts.

Then shade $\frac{2}{4}$ of your rectangle.

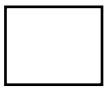
Refine Ideas About What a Fraction Is

APPLY IT

Complete these problems on your own.

1 CREATE

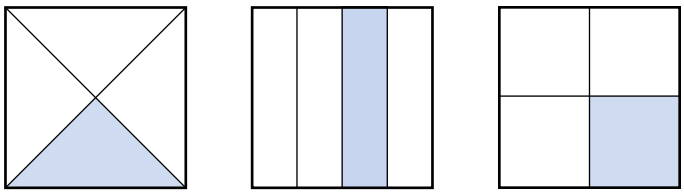
The part shown is $\frac{1}{6}$ of a rectangle. Draw a model to show what the whole rectangle might look like.



2 EXPLAIN

Look at these squares. Each is divided into equal parts.

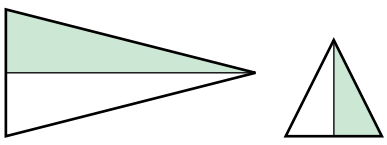
Lynn says each square has the same fraction shaded. Rose says each square has a different fraction shaded. Explain who is correct and why.



3 COMPARE

Look at these triangles. Each is divided into equal parts.

What is the same about the fraction of each model that is shaded?



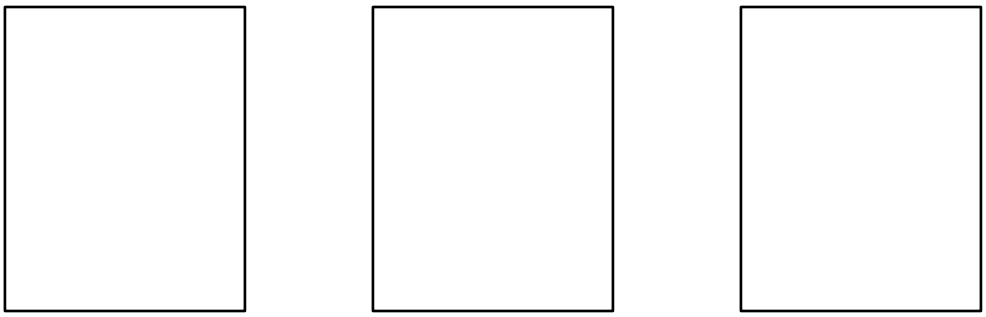
What is different about the fraction of each model that is shaded?

PAIR/SHARE

Discuss your solutions for these three problems with a partner.

Use what you have learned to complete problem 4.

4 Adam has $\frac{1}{3}$ of a pizza, Hillary has $\frac{2}{6}$ of a pizza, and John has $\frac{3}{8}$ of a pizza.



Adam Hillary John

Part A Show the number of equal parts in each pizza. Then shade each pizza to show the fraction each person has.

Part B Circle one of the pizzas. Explain how you knew how many equal parts to show and how many parts to shade.

5 MATH JOURNAL

Mike has a circle divided into equal parts. One part is shaded, and the other three parts are not. Mike says his circle shows the fraction $\frac{1}{3}$. Is he correct? Draw a picture to help you explain.

Explore Equivalent Fractions

Learning Targets

- Recognize and generate simple equivalent fractions. Explain why the fractions are equivalent.
- Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.

SMP 1, 2, 3, 4, 5, 6, 7, 8

Previously you learned that equivalent fractions name the same amount of the whole. In this lesson you will learn more about finding equivalent fractions. Use what you know to try to solve the problem below.

Izzy's mom bakes a cake. She puts chocolate frosting on half of the cake and vanilla frosting on half of the cake. Then Izzy's mom cuts the cake into fourths so that each fourth has either all chocolate or all vanilla frosting.

What fraction other than $\frac{1}{2}$ names the part of the cake that has chocolate frosting?

TRY IT

Math Toolkit

- fraction circles
- 1-inch grid paper
- index cards
- crayons
- fraction models
- number lines

DISCUSS IT

Ask your partner: Can you explain that again?

Tell your partner: I knew . . . so I . . .

CONNECT IT

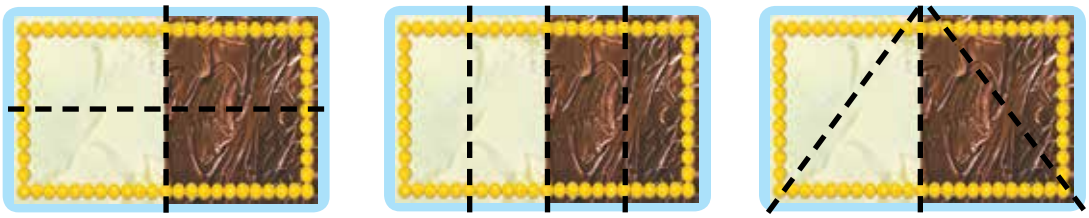
1 LOOK BACK

What fraction other than $\frac{1}{2}$ names the part of the cake that has chocolate frosting? ..... How did you get your answer?

2 LOOK AHEAD

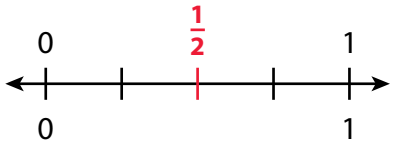
You have seen many different types of fraction models, such as area models, number lines, and fractions bars. You can find equivalent fractions by dividing the same model in different ways.

a. Each cake below shows fourths. Draw lines on one of the cakes to show eighths.



b. How many pieces of the cake have chocolate frosting now? .....

c. You can also look at different equal-sized parts on a number line to find equivalent fractions. Fill in the fraction for fourths that is equivalent to $\frac{1}{2}$.



3 REFLECT

Why does it make sense that $\frac{1}{2}$ and $\frac{2}{4}$ can name the same amount?

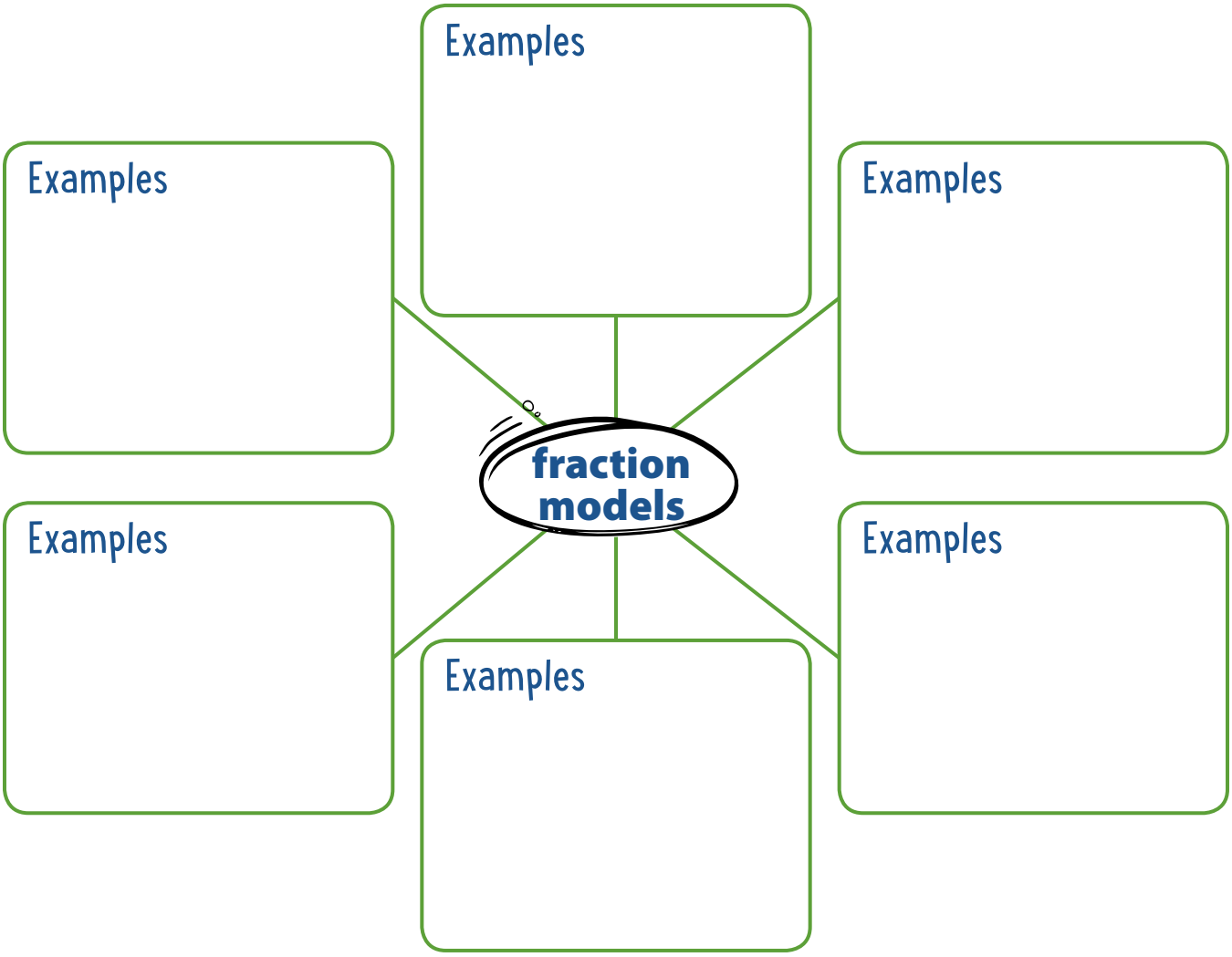
.....

.....

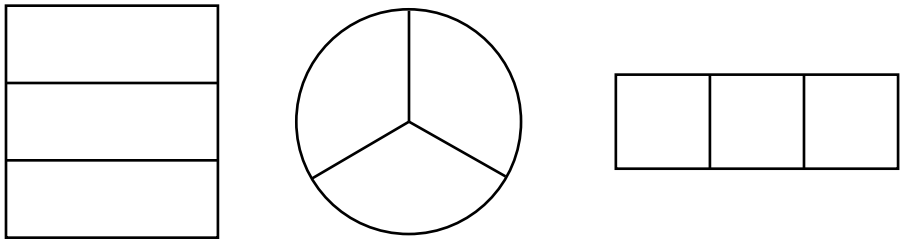
.....

Prepare for Finding Equivalent Fractions

1 Think about what you know about fractions. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.



2 Each fraction model below shows thirds. Draw lines on each model to show sixths.



3 Solve the problem. Show your work.

Len has 3 strips of construction paper. Each strip is the same size and a different color—red, yellow, and pink. He tapes the strips together to make a rectangle.

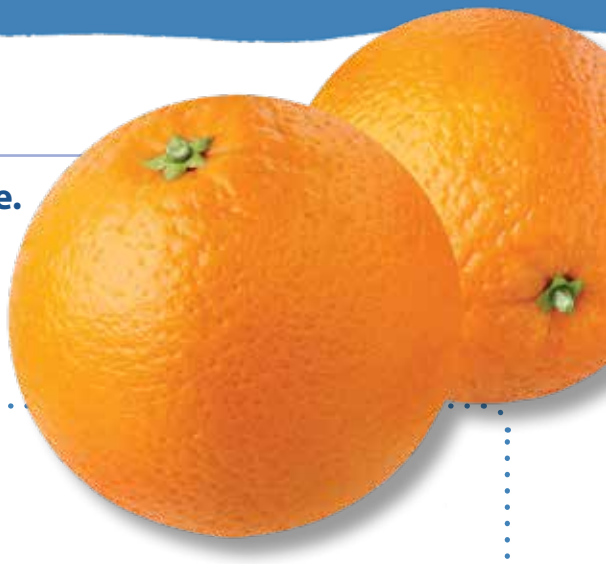
Then Len divides the rectangle into sixths so that each sixth is one color. What fraction other than $\frac{1}{3}$ names the part of the rectangle that is red?

4 Check your answer. Show your work.

Develop Finding Equivalent Fractions

Read and try to solve the problem below.

Carl eats $\frac{2}{8}$ of an orange. Trey's orange is the same size. He eats $\frac{1}{4}$ of it. Show that the two boys eat the same amount of an orange.



TRY IT

Math Toolkit

- fraction tiles
- fraction circles
- fraction models
- number lines
- grid paper

DISCUSS IT

Ask your partner: How did you choose that strategy?

Tell your partner: A model I used was . . . It helped me . . .

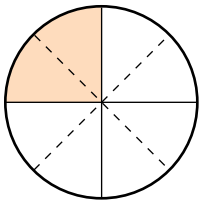
Explore different ways to understand finding equivalent fractions.

Carl eats $\frac{2}{8}$ of an orange. Trey's orange is the same size. He eats $\frac{1}{4}$ of it. Show that the two boys eat the same amount of an orange.

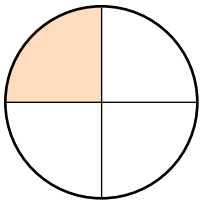
PICTURE IT

You can use models to help find equivalent fractions.

This model shows $\frac{2}{8}$.



This model shows $\frac{1}{4}$.

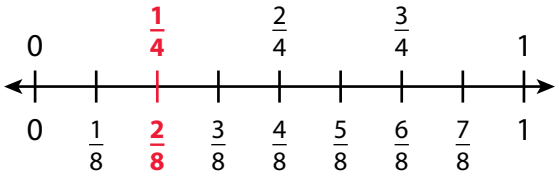


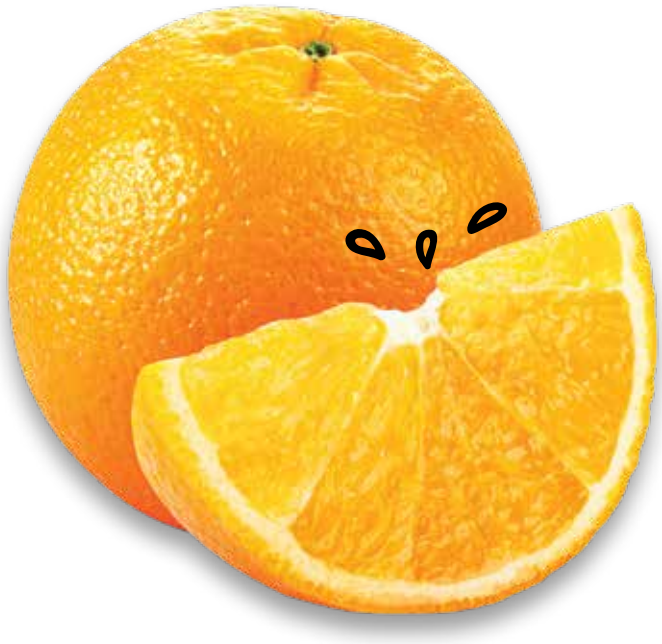
Look at the model of $\frac{2}{8}$. The solid lines divide the circle into fourths. The dashed lines divide each fourth in half to make eighths.

MODEL IT

You can also use a number line to help find equivalent fractions.

This number line shows both fourths and eighths.





CONNECT IT

Now you will use the problem from the previous page to help you understand how to find equivalent fractions.

1. Look at the models in **Picture It**. How do you know that $\frac{2}{8}$ of the first model is shaded?

2. How do you know that $\frac{1}{4}$ of the second model is shaded?

3. Explain how the models show that the fractions $\frac{2}{8}$ and $\frac{1}{4}$ are equivalent.

4. How does the number line in **Model It** show that the fractions $\frac{2}{8}$ and $\frac{1}{4}$ are equivalent?

5. Complete the sentences to show that the fractions of the two oranges name the same amount.

   Use words: Two eighths is equal to _____.

   Use fractions: $\frac{2}{8} =$ _____.

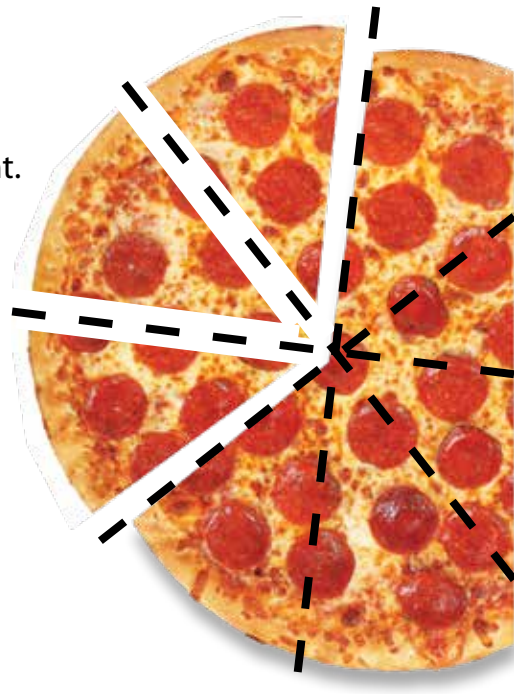
6. Describe two different ways to show two fractions are equivalent.

7 REFLECT

Look back at your **Try It**, strategies by classmates, and **Picture It** and **Model It**. Which models or strategies do you like best for finding equivalent fractions? Explain.

APPLY IT

Use what you just learned to solve these problems.

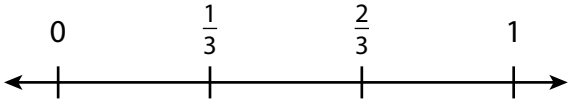


8 Lina and Adam each order a small pizza. They eat the same amount. Lina eats $\frac{3}{4}$ of her pizza. Adam's pizza is divided into 8 slices. How many slices of pizza did Adam eat? Show your work.

Solution

9 Draw a model to show $\frac{2}{3} = \frac{4}{6}$.

10 Use the number line to find a fraction equivalent to $\frac{1}{3}$. Show your work.



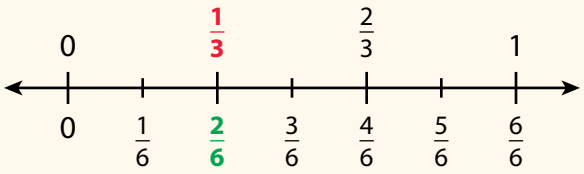
Solution

Practice Finding Equivalent Fractions

Study the Example showing how to find equivalent fractions. Then solve problems 1–8.

EXAMPLE

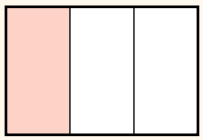
Maria colors $\frac{1}{3}$ of her art paper red. Erica colors $\frac{2}{6}$ of her art paper green. The papers are the same size. Do the two girls color the same amount of their art papers?



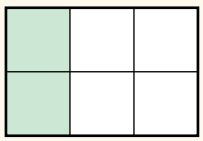
One third is equal to two sixths.

$$\frac{1}{3} = \frac{2}{6}$$

The girls color the same amount of their art papers.

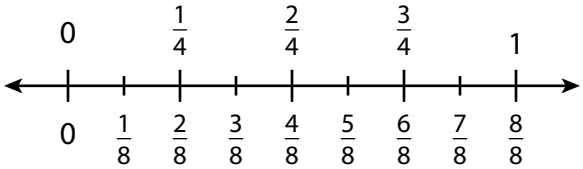


Maria colors $\frac{1}{3}$.



Erica colors $\frac{2}{6}$.

Use the number line to complete the equivalent fractions in problems 1–3.



1. $\frac{1}{4} = \frac{\square}{8}$

2. $\frac{6}{8} = \frac{\square}{4}$

3. $\frac{2}{4} = \frac{\square}{\square}$

Vocabulary

equivalent fractions fractions that name the same point on a number line. $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent.

Shade the models to show equivalent fractions in problems 4 and 5. Then fill in the blanks to write equivalent fractions.

4

$\frac{1}{2} = \frac{\square}{8}$

5

$\frac{2}{3} = \frac{\square}{6}$

Draw lines and shade to show equivalent fractions in problems 6 and 7. Then fill in the blanks to write equivalent fractions.

6

$\frac{1}{2} = \frac{\square}{4}$

7

$\frac{4}{6} = \frac{\square}{3}$

8 What is a fraction equivalent to $\frac{4}{4}$? Explain how you know.

Develop Writing a Whole Number as a Fraction

Read and try to solve the problem below.

Kacey uses 2 boards of the same size to build a birdhouse. He cuts each board into fourths. How can you write the number 2 as a fraction to find how many fourths Kacey cuts the boards into?

TRY IT

Math Toolkit

- fraction tiles
- fraction circles
- fraction bars
- fraction models
- number lines
- grid paper

DISCUSS IT

Ask your partner: How did you get started?

Tell your partner: A model I used was . . . It helped me . . .

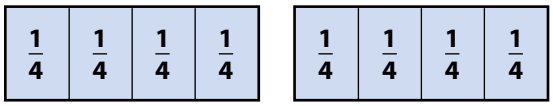
Explore different ways to understand writing a whole number as a fraction.

Kacey uses 2 boards of the same size to build a birdhouse. He cuts each board into fourths. How can you write the number 2 as a fraction to find how many fourths Kacey cuts the boards into?

PICTURE IT

You can use models to help you write a whole number as a fraction.

The fraction bars below show 2 wholes, each divided into fourths.

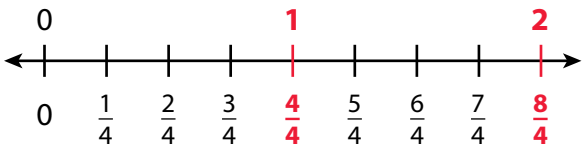


Each part is $\frac{1}{4}$ of a whole. There are eight $\frac{1}{4}$s in all.

MODEL IT

You can use a number line to help you write a whole number as a fraction.

This number line shows whole numbers on the top and fourths on the bottom.



Notice that each whole number has an equivalent fraction with a denominator of 4.

CONNECT IT

Now you will use the problem from the previous page to help you understand how to write a whole number as a fraction.

1. Look at the models in **Picture It**. How many equal parts are shown in 1 whole? Explain how you know.

2. How many equal parts are shown in 2 wholes? Explain how you know.

3. Complete the sentences to show the fraction that is equivalent to 2.

   Use words: Two wholes equals _____.

   Use a fraction: 2 = _____.

   How many fourths does Kacey cut the boards into?

4. Explain how to find a fraction equivalent to a whole number.

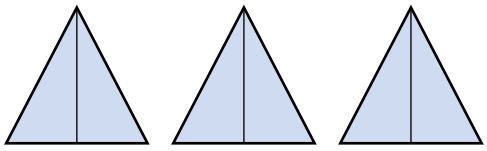
5 REFLECT

Look back at your **Try It**, strategies by classmates, and **Picture It** and **Model It**. Which models or strategies do you like best for writing a whole number as a fraction? Explain.

APPLY IT

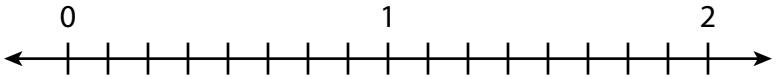
Use what you just learned to solve these problems.

6 Use the model below to write a fraction equivalent to 3.



Solution

7 Louisa has 2 ribbons that are the same length. She cuts each one into eighths. Use the number line below to help you write the number 2 as a fraction to show how many eighths she cuts the ribbons into.



Solution

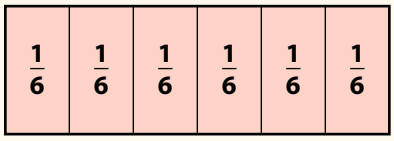
8 Draw a model to show $3 = \frac{18}{6}$. Show your work.

Practice Writing a Whole Number as a Fraction

Study the Example showing different ways to write whole numbers as fractions. Then solve problems 1–13.

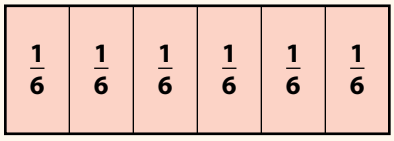
EXAMPLE

Mrs. Clark cuts 2 same-sized pieces of colored paper into sixths to make strips for paper chains. How many strips does she make?



1 whole = six $\frac{1}{6}$s

$1 = \frac{6}{6}$



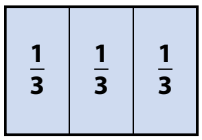
2 wholes = twelve $\frac{1}{6}$s

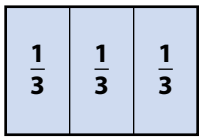
$2 = \frac{12}{6}$

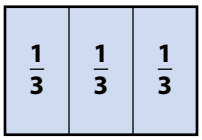
Each strip is $\frac{1}{6}$ of a whole piece of paper.

Mrs. Clark makes 12 strips.

Write the whole numbers as fractions in problems 1–4.







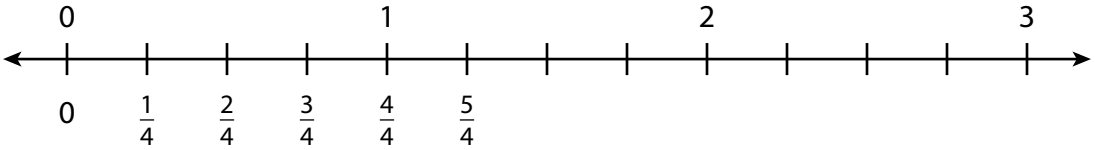
1. $1 = \frac{\square}{3}$

2. $2 = \frac{\square}{3}$

3. $3 = \frac{\square}{3}$

4. $4 = \frac{\square}{3}$

Use this number line to solve problems 5–8.



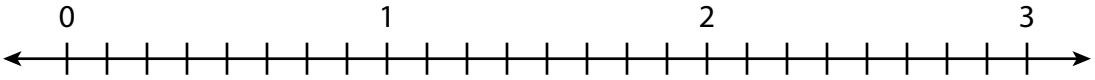
5 $1 = \frac{\square}{4}$

6 $2 = \frac{\square}{4}$

7 $3 = \frac{\square}{4}$

8 $0 = \frac{\square}{4}$

Use this number line to solve problems 9–11.



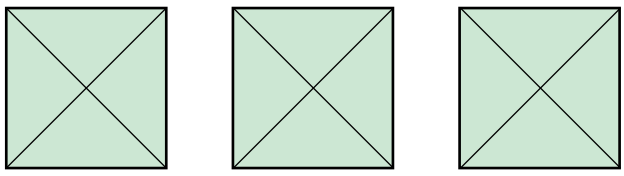
9 One whole is equal to _____ eighths.

10 16 eighths is equal to _____ wholes.

11 $3 = \frac{\square}{8}$

12 Use the model below to write a fraction equivalent to 3.

$3 =$ _____



13 Draw a model to show $2 = \frac{8}{4}$.

Develop Writing a Whole Number as a Fraction with a Denominator of 1

Read and try to solve the problem below.

Justin picks 4 green peppers from his garden. He does not cut them into pieces. How can you write the number of peppers Justin picks, 4, as a fraction?

TRY IT

Math Toolkit

- fraction circles
- fraction tiles
- fraction bars
- fraction models
- number lines
- grid paper

DISCUSS IT

Ask your partner: Do you agree with me? Why or why not?

Tell your partner: I agree with you about . . . because . . .

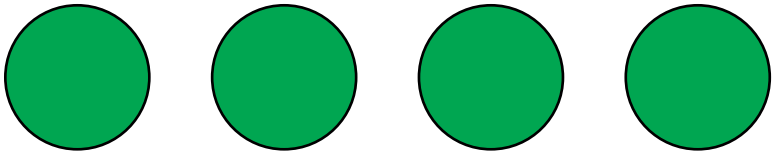
Explore different ways to understand writing a whole number as a fraction with a denominator of 1.

Justin picks 4 green peppers from his garden. He does not cut them into pieces. How can you write the number of peppers Justin picks, 4, as a fraction?

PICTURE IT

You can use models to help you write a whole number as a fraction with a denominator of 1.

Each circle stands for 1 green pepper.

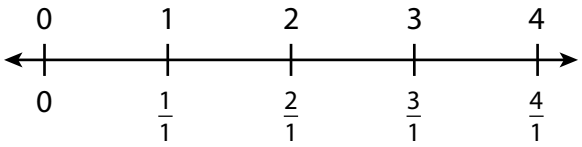


They are not divided into pieces, so each whole has one part.

MODEL IT

You can use a number line to help you write a whole number as a fraction with a denominator of 1.

This number line shows whole numbers on the top and fractions on the bottom.



Notice that each whole number has an equivalent fraction. The spaces between whole numbers are not divided into parts. Each whole number has one part, so the denominator of each equivalent fraction is 1.

CONNECT IT

Now you will use the problem from the previous page to help you understand how to write a whole number as a fraction with a denominator of 1.

1. Look at the models in **Picture It**. Explain how you know each whole has only 1 part.

2. How many parts do the 4 green peppers make? .....

3. What does the numerator of a fraction show?

4. What does the denominator of a fraction show?

5. Write a fraction equivalent to 4. Use the fraction below to help you.

$$\frac{\text{number of parts described}}{\text{number of equal parts in the whole}}$$ .....

6. Explain how to write a whole number as a fraction with a denominator of 1.

7 REFLECT

Look back at your **Try It**, strategies by classmates, and **Picture It** and **Model It**. Which models or strategies do you like best for writing a whole number as a fraction with a denominator of 1? Explain.

.....

.....

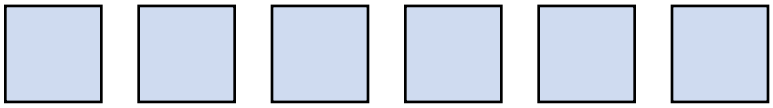
.....

.....

APPLY IT

Use what you just learned to solve these problems.

8 Use the model below to write a fraction equivalent to 6.



Solution

9 Draw a model to show $\frac{5}{1} = 5$.

10 Oscar has 3 loaves of bread that he has not sliced yet. Use a number line to write the pieces of bread Oscar has as a fraction. Show your work.

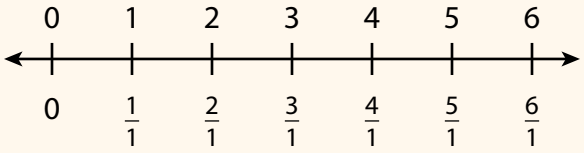
Solution

Practice Writing a Whole Number as a Fraction with a Denominator of 1

Study the Example showing how to write a whole number as a fraction with a denominator of 1. Then solve problems 1–14.

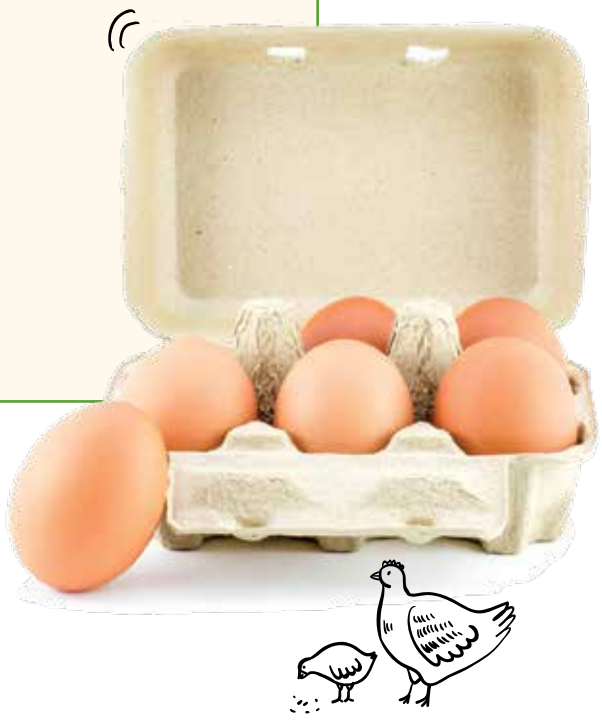
EXAMPLE

The spaces between whole numbers on this number line are not divided into smaller parts. So, each whole has only 1 part.



The number line shows that $\frac{3}{1}$ is equal to 3.

$\frac{3}{1}$ is a fraction name for 3.



Write the whole number for each fraction in problems 1–4.

1. $\frac{4}{1} =$ _____
2. $\frac{2}{1} =$ _____
3. $\frac{5}{1} =$ _____
4. $\frac{8}{1} =$ _____

Write a fraction with a denominator of 1 for each whole number in problems 5–8.

5. $2 =$ _____
6. $5 =$ _____
7. $1 =$ _____
8. $7 =$ _____

Write the whole number for each fraction in problems 9 and 10.

9 $\frac{9}{1} =$ .....

10 $\frac{10}{1} =$ .....

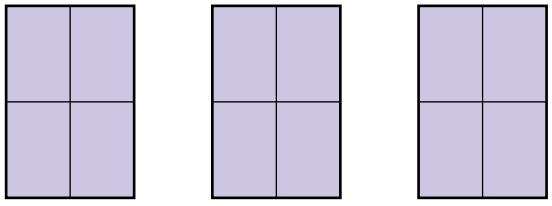
Write a fraction with a denominator of 1 for each whole number in problems 11 and 12.

11 $12 =$ .....

12 $18 =$ .....

13 Explain how to write a whole number as a fraction with a denominator of 1.

14 Bella says this model shows 3 wholes. She says it shows that if you write the whole number 3 as a fraction, you have to write $3 = \frac{12}{4}$.
How can you explain to Bella that there are other ways to write 3 as a fraction?



Vocabulary

numerator the number above the line in a fraction; it tells how many equal parts are being described.

denominator the number below the line in a fraction; it tells how many equal parts are in the whole.

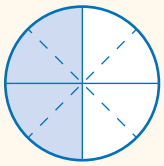
Refine Finding Equivalent Fractions

Complete the Example below. Then solve problems 1–9.

EXAMPLE

Caleb and Hannah buy two melons that are the same size. Caleb cuts his melon into fourths. Hannah cuts her melon into eighths. Hannah eats $\frac{4}{8}$ of her melon. Caleb eats an equal amount of his melon. What fraction of his melon does Caleb eat?

Look at how you could show your work using a model.



Solution

The student used solid lines to show fourths. She used dashed lines to show how to divide fourths to make eighths.

PAIR/SHARE

How could you solve this problem using a number line?

APPLY IT

1 Matt says $\frac{3}{3}$ is equivalent to 1. Elisa says $\frac{8}{8}$ is equivalent to 1. Who is correct? Show your work.

How many thirds are in 1 whole? How many eighths are in 1 whole?

Solution

PAIR/SHARE

What is another fraction that is equivalent to 1?

2 Write two fractions that are equivalent to 5. Show your work.

There will be 5 wholes in all. Think about how many parts will be in each whole.

PAIR/SHARE

How did you decide what denominators to use in your fractions?

Solution

3 Kaia ate $\frac{3}{6}$ of a banana. Zoie ate an equivalent amount. Which fraction shows how much of a banana Zoie ate?

Ⓐ $\frac{1}{3}$

Ⓑ $\frac{2}{3}$

Ⓒ $\frac{5}{8}$

Ⓓ $\frac{1}{2}$

Find $\frac{3}{6}$ on a number line. What is another fraction that names the same location?

Landon chose Ⓐ as the correct answer. How did he get that answer?

PAIR/SHARE

Does Landon's answer make sense?

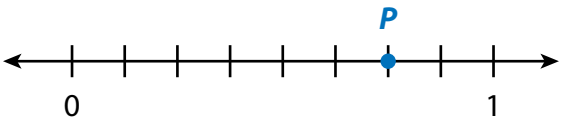
4 Which model shows a fraction equivalent to $\frac{2}{6}$?

Ⓐ Ⓑ Ⓒ Ⓓ

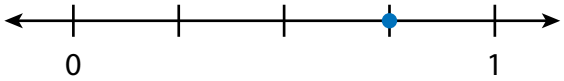
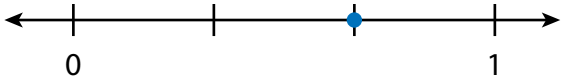
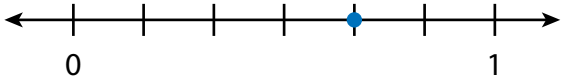
5 Draw a model to find a fraction equivalent to $\frac{1}{4}$. Show your work.

$\frac{1}{4}$ is equivalent to _____.

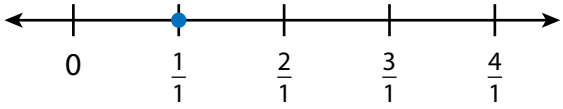
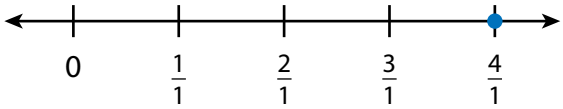
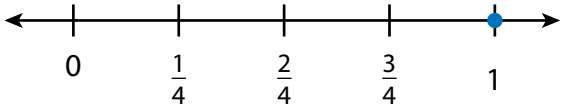
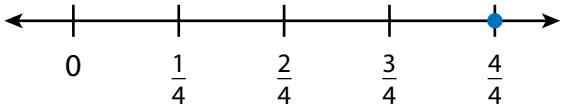
6 Look at point *P* on the number line.



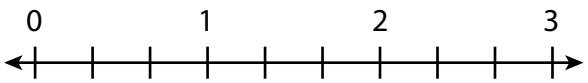
Does the point on each number line below represent a fraction equivalent to the fraction shown by point *P*?

	Yes	No
	Ⓐ	Ⓑ
	Ⓒ	Ⓓ
	Ⓔ	Ⓕ

7 Does the point on each number line represent one whole?

	Yes	No
	Ⓐ	Ⓑ
	Ⓒ	Ⓓ
	Ⓔ	Ⓕ
	Ⓖ	Ⓗ

8 Use the number line to find a fraction equivalent to 3. Show your work.



3 is equivalent to _____.

9 MATH JOURNAL

Write two fractions equivalent to 4 using the denominators 1 and 3. Use a number line to show how you found your answers.

SELF CHECK Go back to the Unit 4 Opener and see what you can check off.

Explore Using Symbols to Compare Fractions

Previously you learned how to compare fractions. In this lesson you will use the symbols $<$, $>$, and $=$ to show how fractions compare. Use what you know to try to solve the problem below.

Erica and Ethan have same-sized glasses. Erica's glass is $\frac{4}{6}$ full of juice. Ethan's glass is $\frac{5}{6}$ full of juice. Compare $\frac{4}{6}$ and $\frac{5}{6}$ using $<$, $>$, or $=$. Who has more juice?

Learning Target

- Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.

SMP 1, 2, 3, 4, 5, 6, 7

TRY IT

Math Toolkit

- fraction tiles
- fraction bars
- fraction models
- number lines
- grid paper
- sticky notes

DISCUSS IT

Ask your partner: How did you get started?

Tell your partner: I started by . . .

CONNECT IT

1 LOOK BACK

Who has more juice? How did you compare $\frac{4}{6}$ and $\frac{5}{6}$ to find out?

2 LOOK AHEAD

You can use the symbols $<$, $>$, or $=$ to compare fractions just as you did to compare whole numbers. Remember that the symbol opens to the greater fraction and points to the lesser fraction.

greater fraction $>$ lesser fraction and lesser fraction $<$ greater fraction

You can use words or a symbol to compare fractions.

$<$ means *less than.* $>$ means *greater than.* $=$ means *equal to.*

a. Use words and a symbol to compare $\frac{1}{2}$ and $\frac{1}{3}$.

$\frac{1}{2}$ is ..... $\frac{1}{3}$.
words

$\frac{1}{2}$ ◯ $\frac{1}{3}$
symbol

b. Use words and a symbol to compare $\frac{1}{4}$ and $\frac{1}{2}$.

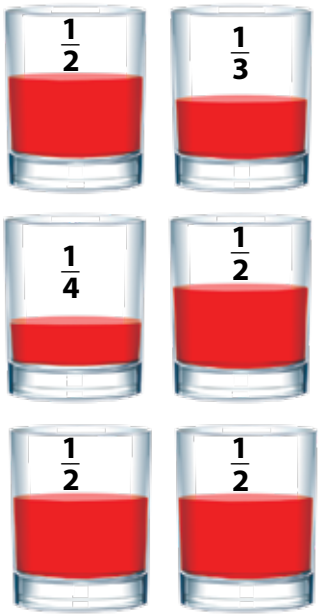
$\frac{1}{4}$ is ..... $\frac{1}{2}$.
words

$\frac{1}{4}$ ◯ $\frac{1}{2}$
symbol

c. Use words and a symbol to compare $\frac{1}{2}$ and $\frac{1}{2}$.

$\frac{1}{2}$ is ..... $\frac{1}{2}$.
words

$\frac{1}{2}$ ◯ $\frac{1}{2}$
symbol



3 REFLECT

What helps you remember what the symbols $>$ and $<$ mean when comparing two numbers?

Prepare for Using Symbols to Compare Fractions

1 Think about what you know about fractions. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.

Word	In My Own Words	Example
greater than		
less than		
equal to		
$>$		
$<$		
$=$		

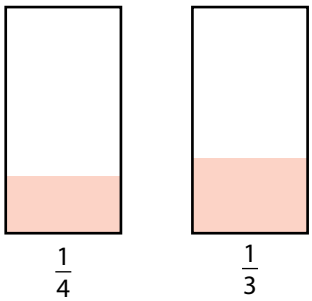
2 Use words and a symbol to compare $\frac{1}{4}$ and $\frac{1}{3}$.

$\frac{1}{4}$ is ..... $\frac{1}{3}$.

words

$\frac{1}{4}$ ◯ $\frac{1}{3}$

symbol



3 Solve the problem. Show your work.

Kim and Armen each buy same-sized sandwiches.
Kim ate $\frac{6}{8}$ of her sandwich. Armen ate $\frac{5}{8}$ of his sandwich.
Compare $\frac{6}{8}$ and $\frac{5}{8}$ using $<$, $>$, or $=$. Who ate more?

Solution

4 Check your answer. Show your work.

Develop Comparing Fractions Using Symbols

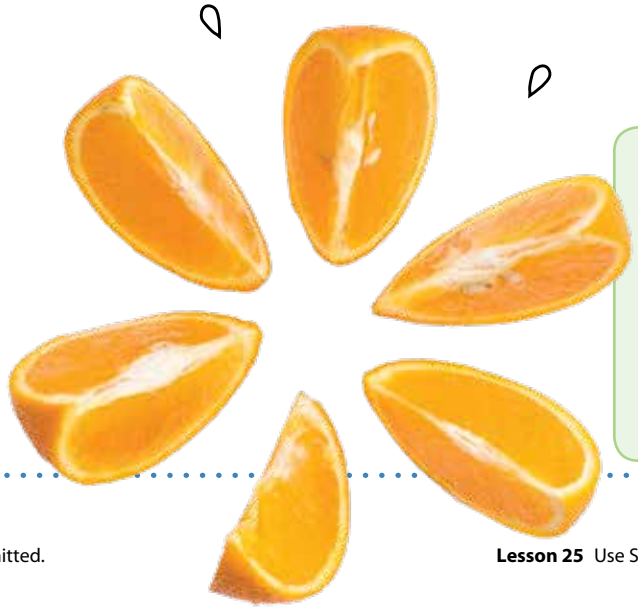
Read and try to solve the problem below.

Compare $\frac{4}{8}$ and $\frac{4}{6}$ using <, >, or =.

TRY IT

Math Toolkit

- fraction tiles
- fraction bars
- fraction circles
- fraction models
- number lines
- grid paper
- sticky notes



DISCUSS IT

Ask your partner: Why did you choose that strategy?

Tell your partner: The strategy I used to find the answer was . . .

Explore different ways to understand comparing fractions.

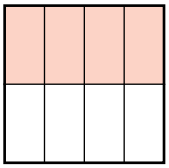
Compare $\frac{4}{8}$ and $\frac{4}{6}$ using <, >, or =.

PICTURE IT

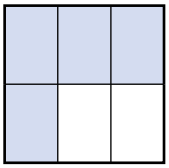
You can use area models to help you compare fractions.

The models show same-sized wholes.

This model shows $\frac{4}{8}$.



This model shows $\frac{4}{6}$.

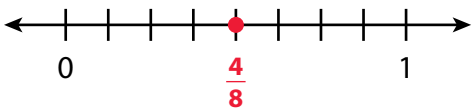


MODEL IT

You can also use number lines to help you compare fractions.

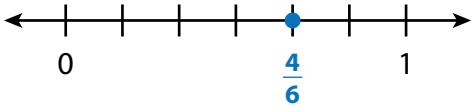
The number lines also show same-sized wholes.

This number line shows $\frac{4}{8}$.

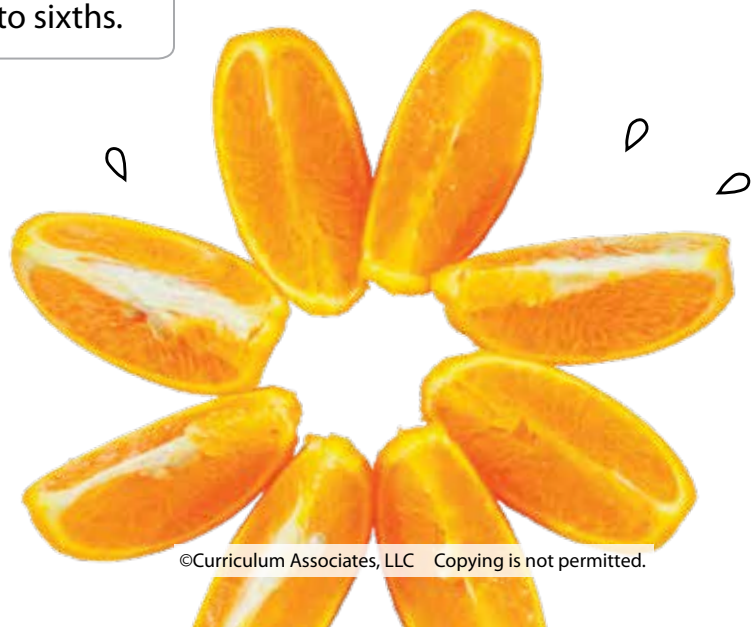


This number line is divided into eighths.

This number line shows $\frac{4}{6}$.



This number line is divided into sixths.



CONNECT IT

Now you will use the problem from the previous page to help you understand how to compare fractions using symbols.

1. Look at the models in **Picture It**. How can you use them to compare $\frac{4}{8}$ and $\frac{4}{6}$?

2. Look at the number lines in **Model It**. How can you use them to compare the two fractions?

3. Compare with words: 4 eighths is _____ than 4 sixths.

   Compare with a symbol: $\frac{4}{8}$ ◯ $\frac{4}{6}$?

4. Now switch the order of the fractions.

   Compare with words: 4 sixths is _____ than 4 eighths.

   Compare with a symbol: $\frac{4}{6}$ ◯ $\frac{4}{8}$?

5. Explain how to use symbols to compare two fractions.

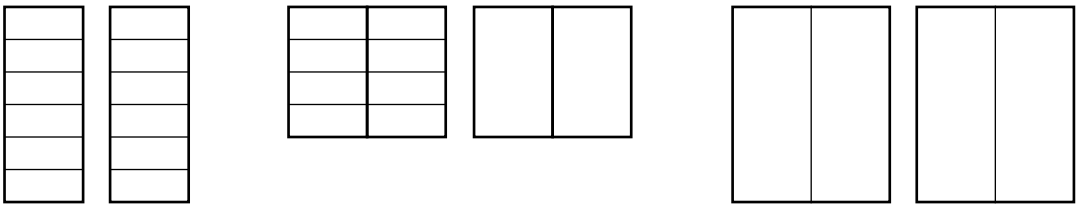
6 REFLECT

Look back at your **Try It**, strategies by classmates, and **Picture It** and **Model It**. Which models or strategies do you like best for using symbols to compare fractions? Explain.

APPLY IT

Use what you just learned to solve these problems.

7 Compare each pair of fractions using $<$, $>$, or $=$. Shade the models to help.



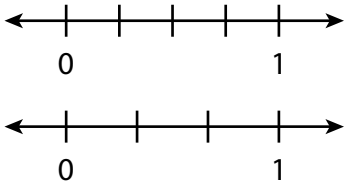
$\frac{4}{6}$ ◯ $\frac{2}{6}$ $\frac{2}{8}$ ◯ $\frac{2}{2}$ $\frac{1}{2}$ ◯ $\frac{1}{2}$

8 Compare each pair of fractions using $<$, $>$, or $=$. Use the number lines to help.

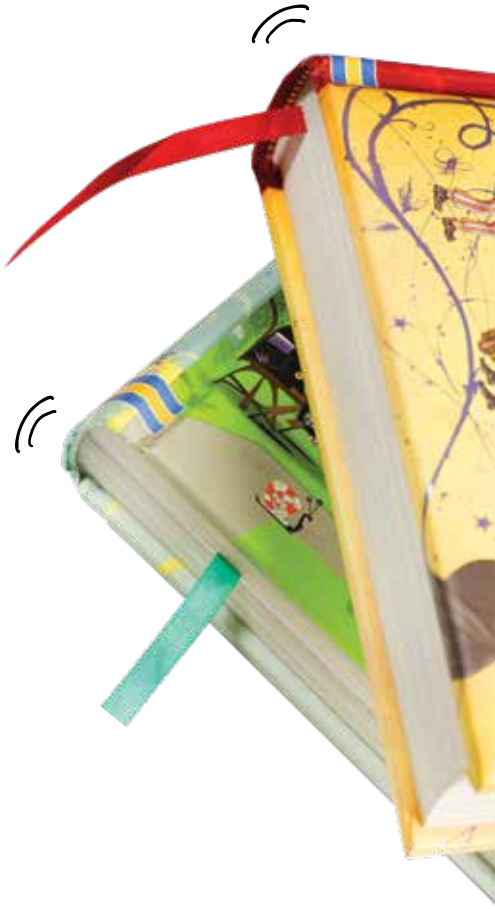
$\frac{3}{4}$ ◯ $\frac{3}{4}$

$\frac{2}{4}$ ◯ $\frac{2}{3}$

$\frac{2}{3}$ ◯ $\frac{1}{3}$



9 Manny and Sarah are reading the same book. Manny has read $\frac{5}{8}$ of the book. Sarah has read $\frac{5}{6}$ of the book. Compare $\frac{5}{8}$ and $\frac{5}{6}$ using $<$, $>$, or $=$. Who has read more? Show your work.



Solution

Practice Comparing Fractions Using Symbols

Study the Example showing how to use symbols to compare fractions. Then solve problems 1–16.

EXAMPLE

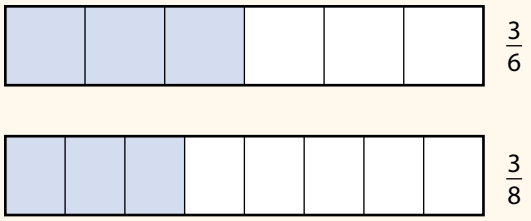
Compare the fractions $\frac{3}{6}$ and $\frac{3}{8}$.

$\frac{3}{6}$ is greater than $\frac{3}{8}$.

$\frac{3}{6} > \frac{3}{8}$

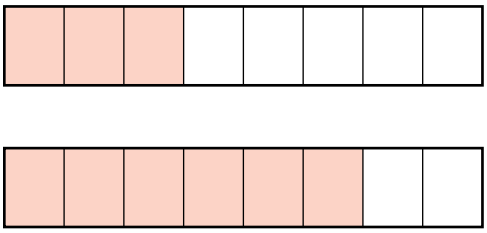
$\frac{3}{8}$ is less than $\frac{3}{6}$.

$\frac{3}{8} < \frac{3}{6}$



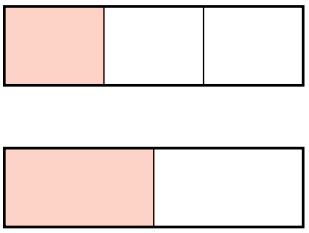
Use the models to compare the fractions in problems 1 and 2. Write <, >, or =.

1



$\frac{3}{8}$ ◯ $\frac{6}{8}$

2



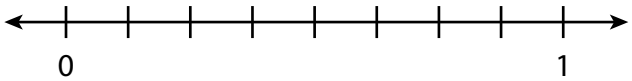
$\frac{1}{3}$ ◯ $\frac{1}{2}$

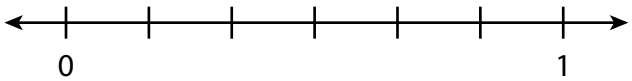
Use the number lines to compare the fractions in problems 3–5. Write <, >, or =.

3 $\frac{3}{8}$ ◯ $\frac{5}{8}$

4 $\frac{4}{6}$ ◯ $\frac{1}{6}$

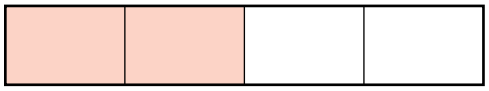
5 $\frac{5}{8}$ ◯ $\frac{5}{6}$



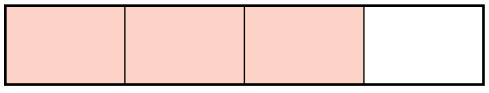


Write the fraction shown in problems 6–10.

6  .....

7  .....

8  .....

9  .....

10  .....

Compare the fractions in problems 11–14. You can use the models above to help you. Write <, >, or =.

11 $\frac{2}{4}$ ◯ $\frac{2}{6}$

$\frac{2}{6}$ ◯ $\frac{2}{4}$

12 $\frac{2}{3}$ ◯ $\frac{2}{6}$

$\frac{2}{6}$ ◯ $\frac{2}{3}$

13 $\frac{3}{4}$ ◯ $\frac{3}{8}$

$\frac{3}{8}$ ◯ $\frac{3}{4}$

14 $\frac{2}{4}$ ◯ $\frac{3}{4}$

$\frac{3}{4}$ ◯ $\frac{2}{4}$

Write a fraction to make the statement true in problems 15 and 16.

15 $\frac{6}{8} >$ .....

16 $\frac{1}{4} >$ .....

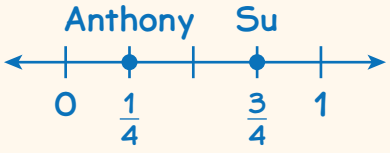
Refine Using Symbols to Compare Fractions

Complete the Example below. Then solve problems 1–8.

EXAMPLE

Su and Anthony live the same distance from school. Su bikes $\frac{3}{4}$ of the way to school in five minutes. Anthony walks $\frac{1}{4}$ of the way to school in five minutes. Compare the fractions using <, >, or =. Who travels the greater distance in these five minutes?

Look at how you could show your work using a number line.



Solution

The fractions have the same denominator, so they are easy to compare on the same number line.

PAIR/SHARE
How do you find the greater number on a number line?

APPLY IT

1 Julia and Mackenzie have the same number of homework problems. Julia has done $\frac{1}{3}$ of her homework. Mackenzie has done $\frac{1}{2}$ of her homework. Compare the fractions using <, >, or =. Which student has done less of her homework? Show your work.

What do you need to think about when you compare fractions that have different denominators?

Solution

PAIR/SHARE
How did you know which fraction was less?

2 Deon and Rob each get same-sized packs of crackers. Deon eats $\frac{3}{6}$ of his crackers. Rob eats $\frac{3}{4}$ of his crackers. Compare the fractions using $<$, $>$, or $=$. Who eats more of his crackers? Show your work.

I think drawing a model might help. Be sure the wholes are the same size.

PAIR/SHARE

Which fraction is made of greater unit fractions? How do you know?

Solution

3 Which fraction goes in the blank to make the comparison true?

$\frac{5}{8} < \_\_\_\_$

Ⓐ $\frac{5}{8}$

Ⓑ $\frac{4}{8}$

Ⓒ $\frac{6}{8}$

Ⓓ $\frac{1}{8}$

Is $\frac{5}{8}$ less than or greater than the fraction that goes in the blank?

Blake chose Ⓐ as the correct answer. How did he get that answer?

PAIR/SHARE

Does Blake's answer make sense?

4 Which fraction goes in the blank to make the comparison true?

$\_\_\_\_ < \frac{2}{8}$

Ⓐ $\frac{2}{4}$

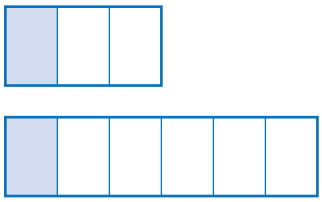
Ⓑ $\frac{4}{8}$

Ⓒ $\frac{1}{8}$

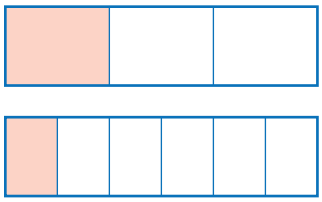
Ⓓ $\frac{2}{6}$

5 Which model can you use to compare the fractions $\frac{1}{3}$ and $\frac{1}{6}$?

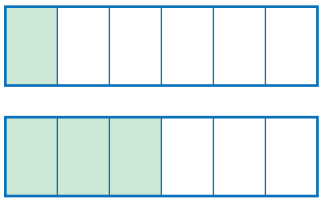
Ⓐ



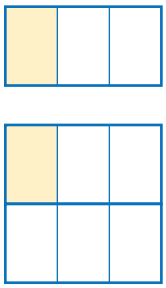
Ⓑ

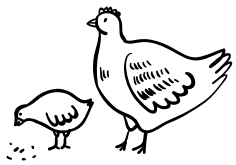


Ⓒ



Ⓓ





6 Write a number from the list below in each box to make the statement true.

6 8 1 3 4

$\frac{\square}{8} < \frac{\square}{8}$

7 Look at the comparison below.

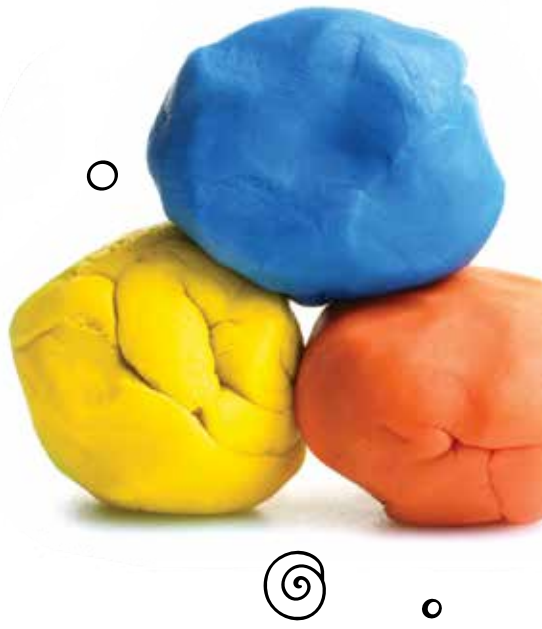
$$\_\_\_\_ < \frac{3}{4}$$

Tyrone writes a fraction in the blank to make the comparison true. His fraction has a 3 in the numerator. What fraction could Tyrone have written? Show your work.

Solution

8 MATH JOURNAL

Tran and Noah are each given the same amount of clay in art class. Tran divides his clay into 3 equal pieces. He uses 2 pieces to make a bowl. Noah divides his clay into 4 equal pieces. He also uses 2 pieces to make a bowl. Tran says that he has more clay left over than Noah. Is Tran correct? Explain.



SELF CHECK Go back to the Unit 4 Opener and see what you can check off.